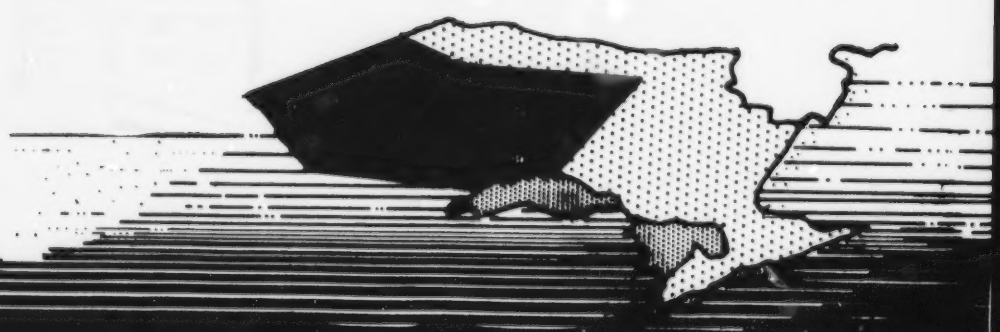

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FISHER (*MARTES PENNANTI*) AND TIMBER MANAGEMENT IN NORTHERN ONTARIO, A LITERATURE REVIEW

by

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Final responsibility for the content rests with the authors.

INTRODUCTION

Fisher (Martes pennanti) is the second largest member of the weasel family in north America. It is a valuable furbearer, readily trapped and is sensitive to changes in both habitat and food supply. Timber management is practiced at varying levels of intensity over all of its range. Effective management of timber and fisher on the same land base requires a good understanding of fisher biology and response to timber management practices. An excellent review of fisher biology is presented by Strickland and Douglas (1987).

This review summarizes the pertinent literature on the biology of the fisher and how logging may affect fisher populations in northwestern Ontario.

POPULATIONS AND HABITAT

In the early 1900's, fisher populations declined sharply in response to habitat modification, extensive logging and overharvest (Rand 1944, de Vos 1952, Bradle 1957, Brander and Books 1973). Populations recovered in Canada after registration of traplines controlled harvest and habitat was restored. However, not all fluctuations in populations can be attributed to habitat or harvest.

Programs in Wisconsin (Irvine et al 1964), British Columbia (Morse 1961), and Michigan (Brander and Books 1973) have proved successful in re-establishing fisher populations in areas where they were previously extirpated. Fisher in Ontario appear to have a 10 year population cycle (de Vos 1951b) although this is less distinct in New York or Maine (Coulter 1960). In addition, population trends, over the last 50 or 60 years, are generally upwards in Ontario.

Fisher abundance is correlated with cover type. Stands of poplar or white birch, stands with more than 74% deciduous trees, and black spruce muskeg lower the carrying capacity of the habitat because of lack of suitable cover or dens in the former and low populations of important prey species in the latter (de Vos 1951a, 1952). Therefore, lower populations of fisher occur in early successional stages of forests than in later ones (de Vos 1952). Conifer ridges are important winter habitat (Raine 1981, 1983, Coulter 1960, Brander and Books 1973) as are white cedar fringes along lakes (de Vos 1952).

Logging has a detrimental short-term effect on fisher populations. There is a general absence of fisher in recently logged or burnt areas probably because of lack of cover, food, or dens (de Vos 1952). Mature to climax successional stages of coniferous forests provide the most suitable fisher habitat because they provide adequate cover and an abundance of potential den sites (de Vos 1951) as apposed to the early successional stages which follow timber harvest or fire. However, fisher populations may not be seriously affected if small clearcuts are well interspersed with uncut forest stands (Powell 1982).

TRAVEL

Fisher movements are dependant upon the availability of food, cover, topography, and weather conditions. Movements are circuital but not restricted to a definite pattern because of the fisher's opportunistic hunting behavior. Travel is concentrated along creeks, lakeshores, and ridges but fisher will travel cross country over small burnt areas (or frozen lakes). Fisher tend to travel in straight lines across open

country (de Vos 1951a, 1952) indicating that they are probably not hunting in these areas.

Fisher usually travel alone but a number of the animals may use the same travel route in winter (Quick 1953). Fisher are restricted in mid-winter by thick soft snow cover, and rely on their own trails or snowshoe hare (Lepus americanus)trails for travel routes (Raine 1981, 1982). Snow cover, depth and texture will vary with stand structure, canopy closure, and ambient weather conditions. Rainfall also appears to restrict movements (de Vos 1951a).

Most fisher activity is terrestrial although they are competent tree climbers (de Vos 1951a, 1952, Brander and Books 1973).

FOOD HABITS

Fisher feed on a wide variety of plants and animals. Snowshoe hare is one of the most important components of the diet (de Vos 1951a, Brander and Books 1973, Powell 1982) and is even more important than the porcupine, of which fisher is a specialized predator (de Vos, 1952, Powell 1982). White-footed mice (Peromysus leucopus), red-backed voles (Clethrionomys gapperi), meadow voles (Microtus pennsylvanicus), and shrews (Powell 1982) as well as squirrels, chipmunks, and other small mammals and birds (Coulter 1960, Bradle 1957) are common prey species. Carrion of large animals will also be consumed in quantity (Hamilton and Cook 1955, Powell 1982) particularly deer (Bradle 1957, de Vos 1952, Hamilton and Cook 1955).

Vegetable foods are relatively unimportant constituents of the fisher diet and are probably consumed only when other foods are difficult

to obtain (Powell 1982). de Vos (1952) reported the use of mountain ash berries, black cherries, pin cherry, choke cherry currants, salmon berries, highbush cranberries, lowbush cranberries, and blueberries .

Fisher sometimes frequent riparian zones because of the availability of ducks, mice, and song birds (de Vos 1952) or the unique vegetation structure provided by these habitats.

The food habits of fisher are diverse and are not restricted to any one prey species. Habitats which sustain relatively high populations of small mammals would be expected to provide good food foraging areas, particularly those that produce abundant hare or small mammals. Well interspersed stands with abundant edge would be conducive to large numbers and diversity of small mammals. Good food producing habitat would have the most value if located adjacent to stands providing shelter or den sites.

HUNTING ACTIVITY

Fisher are primarily nocturnal and terrestrial in their hunting activities (Coulter 1960) although they tend to be active both day and night (de Vos 1952, Hamilton and Cook 1955). Most hunting occurs on the ground (Raine 1981, Brander and Books 1973) with a random investigation of bushy areas, windfalls, hollow trees and other likely small mammal habitats (Brander and Books 1973).

In some areas, fisher rely heavily upon porcupines as a major food source (Hamilton and Cook 1955) although the mainstay of the diet is probably small mammals. Fisher and porcupine population sizes may be correlated (Hamilton and Cook 1955, Bradle 1957) but there is no

conclusive evidence to this effect (Coulter 1960). Porcupine densities in areas with a vigorous fisher population may be significantly below those in areas without fisher (Earle and Kramm 1982).

Hunting is normally concentrated in areas with a high density of prey (de Vos 1952). Fisher will hunt in hardwood areas in Wisconsin where squirrel sign is heavy and around downed tops of previous cutting operations (Bradle 1957). Clearcutting of large areas can significantly reduce the availability of winter foraging areas although selectively cut stands may still be used by fisher for foraging (Powell 1982). Fisher will also continue foraging in areas without a tree canopy (Raine 1981).

REFUGE OR DEN SITES

Fisher dens are frequently in hollow logs or trees and occasionally in an opening in a rock ledge (de Vos 1952, Bradle 1957) although maternity dens are usually found high in large hollow deciduous trees (Morse 1961, Powell 1982). Mature to climax successional stages of coniferous-dominated mixed forests provide an abundance of potential den sites (de Vos 1951, Raine 1981).

Brander and Books (1973) noted how the timber industry may be restricting the number of potential den sites in Michigan by removing older yellow birch, elm, sugar maple, and basswood trees (>50cm dbh). Any silvicultural operation which removes overmature forest or limits the number of standing hollow trees or large fallen trees may reduce the opportunities for fisher dens and therefore limit populations.

HOME RANGES

Males have larger home ranges than females (de Vos 1951, Hamilton and Cook 1955) and may cover an area as large as 8 to 10 square miles.

CONCLUSIONS

A comprehensive habitat suitability index model for the fisher was developed by Allen (1983) along with a review of pertinent literature. The model defines good fisher habitat as dense mixed stands with more than 50% crown closure, multi-storied canopy, and in a late successional stage.

Clearcutting and other forest management practices which revert the stand to an earlier successional stage or simplify the habitat by reducing understory or canopy diversity will reduce the quality of fisher habitat. Cutover patterns which maintain all habitats required for fisher populations on each area of 7-10 km^2 will ensure that habitat does not become limiting. Key areas will be those that offer standing hollow or dead trees for maternal den sites, and good overhead cover for winter shelter. Cutover patterns which maximize edge will help to sustain a large small mammal population for food supply but will be of highest value when in close proximity to undisturbed, dense mixed stands.

Most of the habitat needs for fisher could likely be met by following the Guidelines for Providing Moose Habitat in Timber Management (Ontario, 1987) as suggested for featured species management. Stands remaining for the purpose of limiting clearcut size or the provision of shelter would be of highest value if they belong to vegetation types 7,

8, 9, 10, 11, 14, 15, 17, 21, and 24 of the northwestern Ontario Forest Ecosystem Classification (Sims et. al., 1989).

Information which is lacking and will be needed for a better understanding of how fisher respond to timber harvest are:

1) How long after timber harvest before the regenerating stand will be used for summer or winter hunting or for reproduction?
2) Is there a minimum size of stand that fisher will use for hunting or shelter and how far will a fisher travel to make use of this size of stand?
3) What is the relative importance of food and shelter in determining habitat suitability for fisher?

LITERATURE CITED AND ABSTRACTS

Allen, A.W. 1983. Habitat suitability index models: Fisher. U.S. Dept. Fisher. U.S. Dept. Int., Fish Wildl. Serv. FWS/OBS-82/10.45. 19 pp.

Habitat preferences of the fisher (Martes pennanti) are described in this publication which is one in a series of Habitat Suitability Index (HSI) models. A review and synthesis of the literature is followed by development of a model of the habitat requirements of the fisher throughout its range in the contiguous United States. HSI's are designed for use with habitat Evaluation Procedures previously developed by the U.S. Fish and Wildlife Service.

Author's abstract.

Bradle, B.J. 1957. The fisher returns to Wisconsin. Wis. Cons. Bul. 22:9-11.

Fisher was native to Wisconsin but disappeared in the early 1900's due to habitat destruction by extensive logging and continued trapping. Fourteen fisher have been transplanted from the Adirondacks in New York to the Nicolet National Forest in Wisconsin in an attempt to restore fisher populations. Permanent establishment is the goal not only for furbearing potential but also to control populations of porcupine and snowshoe hare.

Brander, R.B. and D.J. Books. 1973. Return of the fisher. Nat. Hist. 82:52-57.

The original range of the fisher was coincident with the northern coniferous forest from coast to coast. Fisher are presumably dependent on a forest canopy so their range was greatly decreased by settling and logging. Overharvesting of fisher pelts added to the decline. Restocking and protection programs are necessary to establish or increase populations of fisher. This population increase is hoped to decrease porcupine populations and cut timber losses.

Coulter, M.W. 1960. The status and distribution of fisher in Maine. J. Mammal. 4:1-9.

By the 1930's the fisher was found in small numbers in parts of a wilderness area of Maine. The species was protected in 1937. By the mid-1940's an increase in numbers became apparent and by 1950 it was commonly found in a 13,000-square-mile semiwilderness region. During the period 1951-1957 it continued to increase in numbers and rapidly expanded its range to include an additional 10,000 square miles of varied habitat. Areas of hilly terrain have been occupied more rapidly than sections of flat, low-lying woodland.

The recent history of the status of the species suggests that protection has been the most important factor responsible for its notable increase. Because it is easy to trap, has a low reproductive rate, and because its pelt is valuable, control of trapping (including the trapping of other animals for bounty) needs to be exercised if the fisher is to continue to thrive in the Northeast.

Author's abstract.

de Vos, A. 1951a. Recent findings in fisher and marten ecology and management. Trans. 16th N. Amer. Wildl. Conf.:498-507.

Fisher and marten ecology and management were studied in Ontario. Fisher data was emphasized because relatively more information is already available on the marten. Fisher movements are more or less circuital but not restricted. The arboreal habits of fisher are not well developed in Ontario. The main prey species in winter are snowshoe hare, porcupine, fish and mice; fisher also feed on deer and moose carrion.

Both fisher and marten were absent from extensive recently logged and burned-over areas. The amount of cover is an important factor governing the level of survival of both species. Fisher appear to survive better in the early successional stages of the forest than the marten.

Survival and possible increase of both species may be achieved through a well-regulated trapping season instead of the present quota system in Ontario. A restocking effort made in Ontario in 1950 was successful.

de Vos, A. 1951b. Overflow and dispersal of marten and fisher from wildlife refuges. J. Wildl. Manage. 15:164:175.

Trappers' fur returns were analysed in order to find indications of a possible overflow of fur-bearers from Chapleau Crown Game Preserve. Strong indications of such an overflow were found in case of the marten and fisher.

Statistical analysis of the data concerning these two species prove that an overflow and a progressive falling off in abundance away from the Game Preserve exists in case of the marten. This could not be proven formally in case of the fisher. However, inspection of data show marked similarities in pattern for both species, namely a fall from a peak while progressing away from the Preserve. A second slight peak is caused by a surviving population outside the sanctuary.

Data presented indicate that in 1941 there were relatively high populations of both species in the zone adjacent to the Preserve as compared to low ones more remote from it. While during the period 1941-1947 a steep increase in population took

place in the latter zone, this phenomenon was far less noticeable in the former. Consequently, remote areas have a more rapid increase in population than the already populated ones. As this increase is greater than expected by the logistic equation of population growth, and there is no known reason for expecting a differential reproduction, the differential increase is assumed to be partly due to influx.

Cyclic fluctuations are noticeable in the relatively low marten and fisher populations observed.

Author's abstract.

de Vos, A. 1952. The ecology and management of fisher and marten in Ontario. Ont. Dept. Lands For. Tech. Bull. 90 pp.

A study of the biology and problems involved in the management of fisher and marten has been carried out in order to establish a sound management program in Ontario.

As no monograph has been previously published on fisher, the data on this species were emphasized. Information regarding the marten was presented only where it extended the data covered by other papers or where it was of value for comparison with the fisher.

The study was conducted in Ontario from January 1948 to April 1952. It consisted of field, library and laboratory work. The major portion of the field work was done in the Chapleau District.

A review was made of the taxonomic status of fisher and marten in North America. Color variations noticed in the pelts of both species were described.

The foraging movements of the fisher were found to be more or less circuital, but not restricted to a definite pattern. They were apparently governed by the availability of food, topography and cover, with the former (food) probably the most influential factor. Males appeared to have a wider home range than females. Movements varied with the seasons and were governed by weather conditions to an extent.

The fisher is diurnal in habits. It is less arboreal in Ontario than is generally indicated in the literature.

The fisher is fairly solitary in habits, although not to the extent which is commonly described. Young animals stay with the female until about February. Evidence of limited sociability between two or three adults was noticed for the period December to June.

The fisher uses a system of dens. Temporary dens are used for one to a few days, while more permanent ones may be used for several weeks or months. It burrows rarely and then only a few feet. It swims readily, and frequently may take to the water. Marten swim less often.
Analyses of fisher stomachs, intestinal tracts, and scats show that among the mammals snowshoe hare, porcupine, mice and shrews may rank high as prey. Carrion of moose and deer may be eaten whenever available. Contrary to expectations the red squirrel ranks low on the list. Among the birds ruffed grouse were identified as prey. Spruce grouse were reported to be eaten. Berries are apparently eaten in quantities when available; mountain ash and sarsaparilla berries were recovered. Fish may form part of the diet.

The fisher and the marten have few ecto- and endoparasites. Three new endoparasites were found for the fisher: Physaloptera (sp. unknown), Mesocestoides variabilis Mueller, and Ascaris devosi Sprent (sp. Nov.). The latter parasite was also found in several martens.

No clear cut evidence was collected regarding competition of the fisher and the marten, and the amount of predation upon them by other predators.

A survey was made of the present and former status of fisher and marten in Ontario. Both were found most commonly in mature coniferous stands and a comparative study of the conditions for both species in different successional stages of the forest could not disclose any specific agent or complexity of factors influencing or controlling effectively their population levels. Their general absence in recently logged and burnt-over areas is probably the result of the combined effect of several factors, such as lack of cover, food and denning facilities.

The number of fisher caught in Ontario has decreased to less than half the catch of the early twenties; that of marten to about one-sixth. The most probable factors involved in the decrease of both species are changes in their habitat from climax stands to second growth, and over-trapping.

A strong predominance of males was found among trapped martens in Ontario. This unbalanced sex ratio agrees with the findings of Yeager (1950). No abnormal sex ratios were found among trapped fishers.

Provisional age criteria were developed for the fisher. The best criteria for field use seem to be: greatest length of skull, zygomatic breadth, distance between temporal crests and length of sagittal crest.

The findings of this study suggest that certain management procedures might well be instituted. During the low phase of the population cycle of both species the harvest should be reduced in order to enable them to recover more rapidly from scarcity. The maximum allowable harvest in good habitat in Ontario on a sustained yield basis might be about one marten per two square miles and one fisher per six square miles. Restocking of depleted areas with martens can be undertaken successfully without heavy expenditure.

A comparative study was made between three study plots of 144 square miles each in different successional stages of forest cover in the Chapleau Forest District. One plot was selected in an area where no fishers and martens had been trapped since the 1920's and where very drastic environmental changes caused by logging and burning had taken place. The second was chosen in an area where the forest type approached a climax condition and where both fishers and martens were being trapped in large numbers. The third one was selected in Chapleau Game Preserve where no trapping pressure exists, and where the timber types were intermediate to those of the other plots. The numbers and population levels of the various species of mammals and birds present show marked differences between the plots.

Author's abstract.

Earle, R.D. and K.R. Kramm. 1982. Correlation between fisher and porcupine abundance in upper Michigan. Am. Midl. Nat. 107:244-249.

The abundance of porcupines (Erethizon dorsatum) in the upper Peninsula of Michigan was determined from 1975 to 1977. A late winter census showed porcupines were significantly less common in areas where they coexisted with an established fisher (Martes pennanti) population (0.4 porcupines per km^2) than in areas without fishers (3.5 porcupines per km^2). Abundance of dead porcupines found along road-kill routes through two national forests in 1976 and 1977 supported winter census results.

Hamilton, W.J., and A.H. Cook. 1955. The biology and management of the fisher in New York. New York Fish Game J. 2:13-35

The fisher has increased notably in the Adirondack Mountain region in recent years. During the 1940's the species extended its range from the mountainous country to outlying areas. The present population is estimated at 3,000 to 4,000 individuals, or according to trappers, about four times that of 20 years ago.

Fishers apparently move in rough circuits, encompassing an area of about 10 square miles. The males range more widely than do the females. The species is as active by day as at night.

Average measurements (in millimeters) of 27 males were: total length. 940; tail, 350; hind foot, 118. (Corresponding data for 42 females were 808, 306, and 100, respectively. Average weight was 3,707 grams for males and 2,057 grams for females. The largest male weighed 12 pounds, 1 ounce; the largest female, 6 pounds, 15 ounces.

Analysis of 60 stomach and intestinal tracts of late fall and early winter specimens indicated deer (chiefly carrion), red squirrel, red-backed mouse, shrews, varying hare, and porcupine to the principal mammalian food. Grouse and bluejay were the only identifiable bird remains. Fruits of swamp holly, fern tips, and mosses were eaten. Beechnuts occurred in 10 stomachs.

Uterine horns were syringed for blastocysts. These, numbering from one to four, were recovered from seven females. The blastocyst is spherical, amber yellow to pale yellowish white, and has a diameter of 1 millimeter.

Endoparasites identified include Capillaria mustelorum, Physaloptera sp., Arthrocephalus lotoris, Molineus patens, Dracunculus insignis, Uncinaria stenocephala, and Mesocestiodes variabilis.

It is suggested that fishers might be live-trapped and released in suitable habitats of the Catskill Mountains, where the species does not presently occur.

Authors' abstract.

Irvine, G.W., L.T. Magnus, and B.J. Bradle. 1964. The restocking of fishers in Lakes States forests. Trans. N. Am. Wildl. Nat. Resour. Conf. 29:307-15.

A total of 121 fisher were released in the Nicolet and Ottawa National Forests in Wisconsin and Michigan respectively. Observations indicate that these fisher have survived and most of them have remained within 30 miles of the release areas. There is evidence of fisher reproduction and predation on porcupines. It is premature to determine if this release will be successful in establishing a fisher population especially in areas with unrestricted predator trapping and a bounty system.

Morse, W.B. 1961. The return of the fisher. Am. For. 67:24-26.

Fisher are being restocked in Montana, Oregon and Idaho from British Columbia to restore furbearer populations and to institute a biological control of the porcupine. The fisher were lived trapped, ear-tagged and then placed in a small metal shipping case. Transportation to the release site was by truck and then helicopter. Upon release, the fisher headed for the

timber. Similar programs in the northeastern United States have been successful. In Montana, a released female was caught a year later and had successfully bred in the wild.

Ontario. 1987. Guidelines for providing moose habitat in timber management. Ont. Min. Natur. Resour. 30 pp.

Powell, R.A. 1982. The fisher, life history ecology and behavior. Univ. Minn. Press, Minniapolis. 217 pp.

Quick, H.F. 1953. Wolverine, fisher and marten studies in a wilderness region. Trans. N. Amer. Wildl. Conf. 18:513-532.

Marten used various habitats throughout northeastern British Columbia but avoided muskeg. Trapping does not adequately reflect true sex ratios of the population.

Raine, R.M. 1983. Winter habitat use and responses to snow cover of fisher (Martes pennanti) and marten (Martes americana) in southeastern Manitoba. Can. J. Zool. 61:25-34

A trailing study of fisher (Martes pennanti) and marten (Martes americana) in the boreal forest of Manitoba, conducted over two winters, showed that both species preferred coniferous ridges. They also had temporal differences in their habitat use that would be partially explained by their different responses to soft snow cover. Movements of fisher were found to be restricted by the soft, thick snow cover that was present during midwinter. Fewer tracks were observed at that time, and fisher travelled upon snowshoe hare trails and their own trails more than in either the early winter period of thin snow cover or the late winter period of crust conditions. Fisher were also found to walk through the snow cover and leave a body drag in midwinter. Marten did not appear to be hindered by soft snow cover to the degree that fisher were. Marten tracks were encountered with equal frequency throughout the winter and marten never left a body drag in the snow cover. They did travel upon hare trails and their own trails to a greater extent in midwinter, but never as much as did fisher.
Author's abstract.

Raine, R.M. 1982. Ranges of juvenile fisher, Martes pennanti and marten, Martes americana, in Southeastern Manitoba. Can. Field-Nat. 96:431-438.

A radio-telemetry study of a resident population of fisher and an invading population of marten was conducted from August 1978 to August 1980, in the boreal forest of southeastern Manitoba. Two juvenile, female fisher had winter ranges of 15.0 and 20.5 km^2, while other juvenile females and males dispersed from the study area after their release. One juvenile, male marten had a range of 9.6 km^2 in early winter, while another wandered at

random in late fall and early winter, but had a range of 8.1 km^2 by the following spring. A juvenile, female marten had seasonal ranges varying from 6.0 to 8.4 km^2. A fire that swept through the study area in May 1980 perhaps caused one male marten to disperse 61 km, while a female marten did not alter her range during the two months that radio contact was maintained.

Author's abstract.

Raine, R.M. 1981. Winter food habits, responses to snow cover and movements of fisher (Martes pennanti) and marten (Martes americana) in southeastern Manitoba. M. Sc. Thesis, University of Manitoba, Winnipeg. 144 pp.

A trailing and radiotelemetry study of fisher and marten was conducted from August, 1978 to August, 1980 in the boreal forest of southeastern Manitoba.

Snowshoe hares composed 81% of the winter diet of fisher and 53% of the diet of marten. Marten displayed more subnivean and arboreal activity, and ate more microtines and squirrels than did fisher. Fisher ate marten twice. Both fisher and marten were found to pursue hares actively for distances of up to 1 km.

Fisher were found to be restricted by the soft, thick snow cover that was present during midwinter. Fewer tracks were observed at this time, and fisher travelled upon snowshoe hare trails and their own trails to a greater extent than in either the early winter period of thin snow cover or the late winter period of crust conditions. Fisher were also found to walk through the snow cover and leave a body drag in midwinter.

Marten did not appear to be hindered by soft snow cover to the degree that fisher were. Marten tracks were encountered with equal frequency throughout the winter and they never left a body drag in the snow cover. They did travel upon hare trails and their own trails to a greater extent in the midwinter, but never as much as did fisher.

Two juvenile, female fisher and winter home ranges of from 15.0-20.5 km^2, while other juvenile females and males dispersed from the study area after their release.

One juvenile, male marten had a home range of 9.6 km^2 in early winter, while another wandered at random in late fall and early winter, but appeared to have a permanent home range of 8.1 km^2 by the following spring. A juvenile, female marten had seasonal home ranges of from 6.0 - 8.4 km^2.

A fire that swept through the study area in May 1980 caused one male marten to disperse 61 km, while a female marten did not alter her home range during the 2 months that radio contact was maintained.
Author's abstract.

Rand, A.L. 1944. The status of the fisher Martes pennanti (Erxleben) in Canada. Can. Field Nat. 58:77-81.

The fisher is one of our scarcest and most valuable wild caught furs. It was never common and is slowly decreasing in numbers. However even now a sizable stock of animals exists in the wild, a stock that deserves close attention. If it decreases much more it may become so scarce as to be unable to recover its number if given protection.

The total contribution of the fisher to the yearly fur output is so small that its temporary withdrawal from the fur trade for a few years, by protection, would work hardship on no one.

Though the total fisher yield is but a small portion of the total fur catch, the value of individual skins is such that a small increase in skins would mean a large increase in the value of the catch. One fisher skin might bring more than the average catch of a Nova Scotia trapper. The animal is worth strenuous efforts to increase its numbers, both for the substantial increase this would mean to trappers incomes, and for the betterment of the status of the species in Canada.

The cyclic nature of its fluctuation in numbers suggests one type of management to enable the fisher to recover more quickly from periods of scarcity, and to provide a larger harvest over more years, in periods of abundance.

Fur farms are raising fisher, and successfully breeding them, but the yield from this source is as yet of little importance.
Author's abstract.

Sims, R.A., W.D. Towill, K.A. Baldwin, and G.M. Wickware. In preparation. Northwestern Ontario forest ecosystem classification.

A guide to the vegetation and soil types that comprise the ecosystem of northwestern Ontario.

Strickland, M.A. and C.W. Douglas. 1987. Fisher. p.511-529. In Novak, M., J.A. Baker, M.E. Obbard, and B. Malloch. Eds. Wild furbearer management and conservation in North America, Ont. Trappers Assoc. 1150 p.

Fisher biology, management, and taxonomy are described in detail along with discussion of economic importance.